Health and Safety Plan for Operable Unit 10-04 Remedial Investigation/Feasibility Study

1. INTRODUCTION

This Health and Safety Plan (HASP) establishes the procedures and requirements that will be used to eliminate and/or minimize health and safety risks to persons working at the Operable Unit 10-04 Remedial Investigation/Feasibility Study [OU10-04 (RI/FS)]. This HASP meets the requirements of the Occupational Safety and Health Administration (OSHA) standard, 29 Code of Federal Regulations (CFR) 1910.120/1926.65, "Hazardous Waste Operations and Emergency Response (HAZWOPER)." Its preparation is consistent with information found in the National Institute of Occupational Safety and Health (NIOSH)/OSHA/United States Coast Guard (USCG)/Environmental Protection Agency (EPA) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985); Lockheed Martin Idaho Technologies Company (LMITCO) *Safety and Health Manuals;* and LMITCO *Radiological Controls Manual* and *Radiation Protection Manual.* This HASP complies with the authorized safety basis detailed in *Hazard Classification of Environmental Restoration Activities at the INEEL.*

This HASP governs all work at the OU10-04 that is performed by LMITCO employees, subcontractors to LMITCO, and employees of other companies, or Department of Energy (DOE) laboratories. Persons not normally assigned to work at the site, such as representatives of DOE, the State of Idaho, OSHA, and the EPA are considered nonworkers who fall under the definition of "occasional site workers" as stated in OSHA 29 CFR 1910.120/1926.65. Appendices A and B contain the training acknowledgement forms needed by field personnel to perform field work.

1.1 INEEL Site Description

The Idaho National Engineering and Environmental Laboratory (INEEL), formerly the National Reactor Testing Station (NRTS), encompasses 890 mi^2, and is located approximately 34 miles west of Idaho Falls, Idaho (see Figure 1).

The United States Atomic Energy Commission, now the DOE, established the NRTS in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been the storage facility for transuranic radionuclides (TRU) and low-level radioactive waste (LLW) since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The DOE Idaho Operations Office (DOE-ID) has responsibility for the INEEL, and designates authority to operate the INEEL to government contractors. LMITCO, the current primary contractor for DOE-ID at the INEEL, provides managing and operating services to the majority of INEEL facilities.

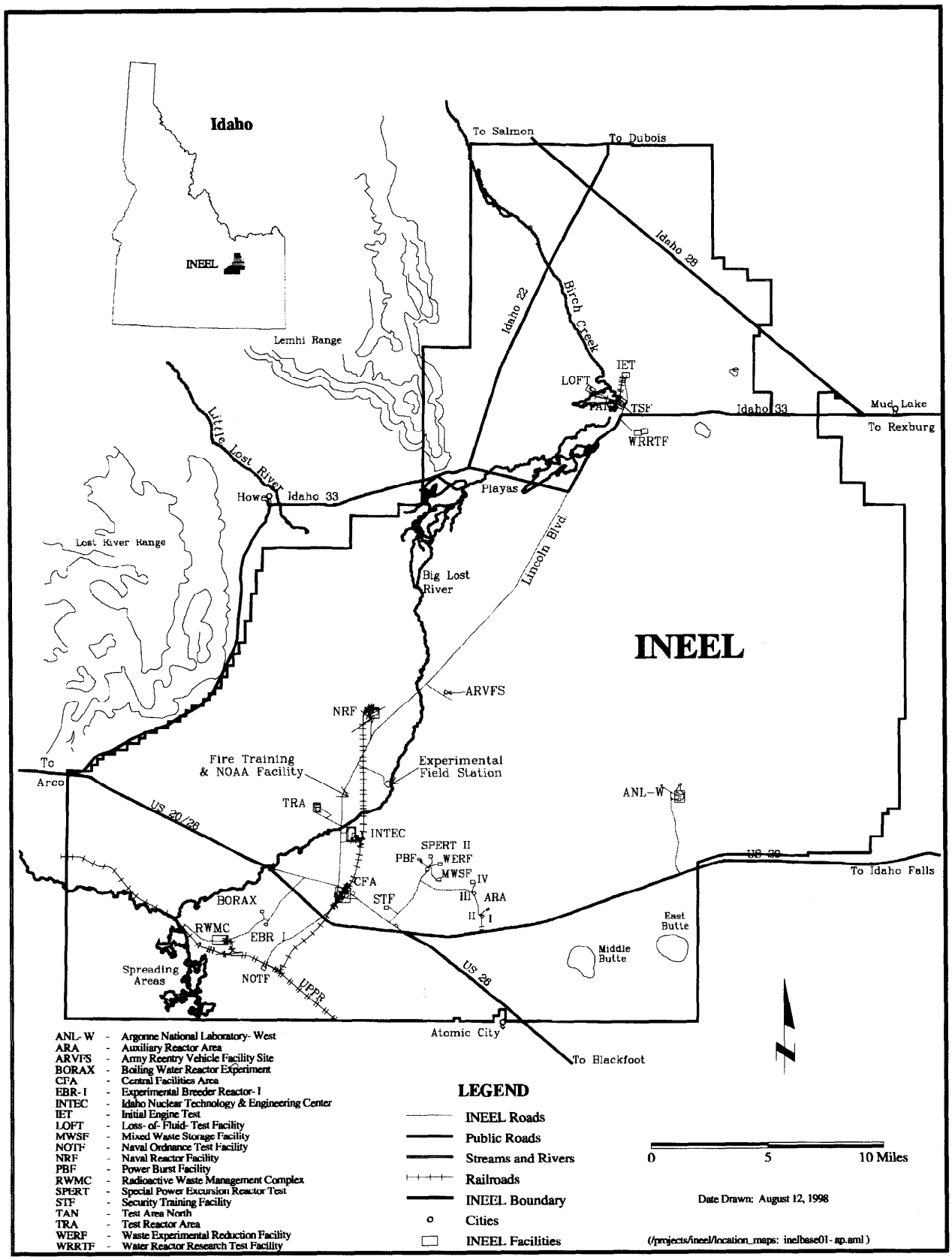

Figure 1. Map of the INEEL Site showing location of major facilities.

1.2 Site Description

This OU 10-04 RI/FS HASP covers sampling activities for three field investigations efforts:

1. Explosive compounds/residues in soils (Appendix C)

2. Organic-Moderated Reactor Experiment (OMRE) area (Appendix D)

3. Wild onion assessment (Appendix E).

Descriptions of each site covered under this HASP are outlined in Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).

1.3 Scope of Work

The scope of work for OU10-04 RI/FS involves the preparation and mobilization of the people and resources necessary to safely collect samples and obtain the data necessary for characterizing the sites under investigation. At each site, the scope will be performed in three phases:
(1) Premobilization/Preparation, (2) Performance of Work, and (3) Demobilization/Closeout.
Site-specific scopes and tasks are outlined in Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions). General components of each phase are listed below:

Phase I—Premobilization

1. Prepare and obtain necessary Work Control packages

2. Prepare and approve a Health and Safety Plan (HASP) and Field Sampling Plan (FSP)

3. As required, prepare/obtain National Environmental Policy Act (NEPA) Documentation, Hazard Categorization Determination, Safe Work Permits (SWPs), Storm Water Prevention Plan (SWPP), and other permits

4. Ensure training requirements for sampling team members are complete and documented

5. Obtain necessary equipment and supplies

6. Ensure a Task Order Statement for the analytical laboratory is complete.

Phase II—Performance of Work

Stage 1. Daily Preparations

1. Complete a daily prejob briefing, which includes: outlining the Plan of the Day (POD); evaluate the hazards and mitigative measures; and review emergency response procedures.

2. Make notifications to the Central Facilities Area (CFA) Area Director, Warning Communications Center (WCC), Security, Shipping, etc., as necessary.

3. Inventory the equipment and supplies necessary to safely complete the day's activities.

4. Record daily preparations in the logbook.

Stage 2. Sampling and Decontamination

1. Locate, collect, label, and preserve samples according to the procedures outlined in the FSP.
2. Perform decontamination procedures as outlined in the FSP.
3. Mark/survey sample locations as outlined in the FSP.
4. Record sampling activities in logbook.

Stage 3. Documentation and Shipping

1. Complete Chain-of-Custody forms for all samples
2. Complete any required radiation screening/analysis before shipment.
3. Package samples and label shipping container (in accordance with company procedures) for shipment to the certified analytical laboratory.
4. Complete shipping papers.
5. Transport shipping container to CFA shipping.

Stage 4. Closeout of Day's Activities

1. Secure any unshipped samples according procedures.
2. If hazardous waste is generated, secure in the satellite accumulation area (SAA) and make entry in SAA logbook.
3. Ensure all paperwork, logbook entries, and documentation are complete and secured.
4. Notify project manager of day's progress.
5. Prepare for next day's activities.

NOTE: *Sequence of events may vary depending on resource availability and field conditions.*

Phase III—Demobilization and Closeout of Project

1. Ensure all samples, waste, and equipment are accounted for. If waste was generated in the SAA, begin process waste disposition/disposal process.
2. Receive data packages from analytical laboratory.
3. Prepare Final Report
4. At conclusion of project, ensure all logbooks, chain of custody forms (COCs), and other required documentation are submitted to Environmental Restoration (ER) document control.

2. KEY SITE PERSONNEL RESPONSIBILITIES

The organizational structure for projects reflects the resources and expertise required to perform the work, while minimizing risks to worker health and safety, the environment, and the general public. **The names of the individuals in key roles at the site, and lines of responsibility and communication, are shown in the organizational charts of Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).** The following sections outline the responsibilities of key site personnel.

2.1 Environmental Restoration Director

The LMITCO ER director has the ultimate responsibility for the technical quality of all projects, maintaining a safe environment, and the safety and health of all personnel during field activities performed by or for the ER Program. The ER director provides technical coordination and interfaces with the DOE-ID Environmental Support Office. The ER director ensures that:

- Project/program activities are conducted according to all applicable federal, state, local, and company requirements and agreements
- Program budgets and schedules are approved and monitored to be within budgetary guidelines
- Personnel, equipment, subcontractors, and services are available
- Direction is provided for the development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports.

2.2 ER ESH&QA Manager

The ER Program ESH&QA manager, or designee, is responsible to manage ESH&Q resources to ensure that ESH&QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the day-to-day operations for the ER Program operations conducted at the INEEL. The manager directs the ESH&Q compliance accomplishment of all activities by providing technical and administrative direction to subordinate staff and through coordination with related functional entities. The ER ESH&QA Manager reports to the ER Director. Under the direction of the ER Director, the ER ESH&QA Manager represents the ER Directorate in all ESH&QA matters. This includes responsibility for ER Program ESH&QA management compliance and oversight for all ER CERCLA and D&D operations planned and conducted at TAN (WAG 1), TRA (WAG 2), INTEC (WAG 3), CFA (WAG 4), ARA/PBF (WAG 5), Borax (WAG 6) , RWMC (WAG 7) and other nongeographic facility locations (WAG 10) and for ER Program INEEL-wide Environmental Monitoring activities.

The ER ESH&QA Manager is responsible for the management of the following technical disciplines and implementation of the programs related to these disciplines:

- Radiological Controls personnel
- Environmental Support personnel
- Industrial Safety personnel

- Fire Protection personnel
- Quality Assurance personnel
- Industrial Hygiene personnel (Matrixed)
- Emergency Preparedness personnel (Matrixed).

2.3 LMITCO Project Manager

The LMITCO Program Manager (PM) shall ensure that all activities conducted during the project comply with LMITCO management control procedures (MCPs) and program requirements directives (PRDs); all applicable OSHA, EPA, DOE, Department of Transportation (DOT), and State of Idaho requirements; and that tasks comply with PLN-125, *Quality Program Plan for the Environmental Restoration Program*, the quality assurance project plan (QAPjP), this HASP, and the Sampling and Analysis Plan (SAP). The PM coordinates all document preparation, field, laboratory, and modeling activities. The LMITCO PM is responsible for the overall work scope, schedule, and budget. The LMITCO PM will ensure that an Employee Job Function Evaluation (Form 340.02) is completed for all project employees, reviewed by the project industrial hygienist (IH) for validation, and then submitted to the Occupational Medical Program (OMP) for determination of whether a medical evaluation is necessary.

2.4 Field Team Leader

The Field Team Leader (FTL) will represent the ER organization at the site with delegated responsibility for the safe and successful completion of the project. The FTL works to manage field sampling or operations, and to execute the work plan. The FTL enforces site control, documents activities, and may conduct the daily safety briefings at the start of the shift. Health and safety issues should be brought to the attention of the FTL.

The FTL will interact with the health and safety officer, industrial hygienist, safety engineer, radiological engineer, radiological control technician, and other health and safety professionals on matters regarding health and safety. If the FTL leaves the site, an alternate individual will be appointed to act as the FTL. Persons acting as FTL on the site must meet all the FTL training requirements outlined in Section 4. The identity of the acting FTL shall be conveyed to site personnel, recorded in the FTL logbook, and communicated to the Area Director representative when appropriate.

2.5 Sampling Team

The sampling team will be led by a designated FTL. The sampling team will perform the onsite tasks necessary to collect the samples. Tasks will include equipment preparations and maintenance, sample collection and preservation, equipment decontamination, custody and shipping forms, and sample shipments. The sampling team will consist of a minimum of two members, and the buddy system will be implemented. The IH and RADCON personnel will support the sampling team when inside the contamination area.

2.6 Site Personnel

All site personnel, including LMITCO, subcontractor personnel, and summer hires, shall understand and comply with the requirements of this HASP. Site personnel will be briefed by the FTL at

the start of each shift. During the prejob briefing the daily tasks, associated hazards, engineering and administrative controls, required personal protective equipment (PPE), work control documents, and emergency conditions and actions will be discussed. Input from the project health and safety officer (HSO), IH, and RADCON personnel to clarify task health and safety requirements will be provided.

Once at the site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. **If it is perceived that an unsafe conditions poses an imminent danger, site personnel are authorized to stop work immediately, then notify the FTL or HSO of the unsafe condition.**

2.7 Nonworkers

All persons who may be on the site, but are not part of the field team, are considered nonworkers for the purposes of this project (e.g., surveyor, equipment operator, or other crafts personnel not assigned to the project). A person shall be considered "onsite" when they are present in or beyond the designated support zone (SZ). Nonworkers will be deemed occasional site workers per 29 CFR 1910.120/1926.65, and must meet minimum training requirements for such workers and any additional site-specific training that is identified in Section 4. If the nature of a nonworker's tasks requires entry into the exclusion zone (EZ) or radiologically controlled areas, then they must meet all the same training requirements as other field team members. Also, all nonworkers must be accompanied by a site representative until they have completed their 3 days of supervised field experience.

2.8 Visitors

All visitors with official business at the site, including LMITCO personnel, representatives of DOE, and/or state or federal regulatory agencies may not proceed beyond the SZ without receiving site-specific HASP training, signing an HASP training acknowledgment form, receiving a safety briefing, wearing the appropriate PPE, and providing proof of meeting all training requirements specified in Section 4 of this HASP. Visitors will be escorted by a fully trained site representative (such as the FTL or HSO, or a designated alternate) at all times while on the site.

A casual visitor to the site is a person who does not have a specific task to perform or other official business to conduct at the site. Casual visitors are not permitted on the site.

2.9 Health and Safety Officer

The HSO serves as the primary contact for health and safety issues. The HSO advises the FTL on all aspects of health and safety, and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as long as they do not interfere with the primary responsibilities. The HSO is authorized to verify compliance to the HASP, conduct inspections, require and monitor corrective actions, monitor decontamination procedures, and require corrections, as appropriate. The HSO is supported by ES&H professionals at the site (safety engineer, IH, RCT, radiological engineer, and facility representative, as necessary).

Persons assigned as the HSO, or alternate HSO, must be qualified to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SE, or in some cases the FTL, other site responsibilities of the HSO must not conflict with the role of the HSO at the site. If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, the identity of the acting HSO will be recorded in the logbook, and site personnel will be notified.

2.10 Industrial Hygienist

The assigned LMITCO IH is the primary source for information regarding nonradiological hazardous and toxic agents at the site. The IH may also serve in the HSO role. The IH assesses the potential for worker exposures to hazardous agents according to the LMITCO *Safety and Health Manual* MCPs and accepted industry IH practices and protocol. By participating in site characterization, the IH assesses and recommends appropriate hazard controls for the protection of site personnel, operates and maintains airborne sampling and monitoring equipment, reviews for effectiveness, and recommends and assesses the use of PPE required in this HASP (recommending changes as appropriate).

Following an evacuation, the IH in conjunction with other recovery team members, will assist the FTL in determining whether conditions exist for safe site reentry. Personnel showing health effects (signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an OMP physician by the IH, their supervisor, or the HSO. The IH may have other duties at the site, as specified in other sections of this HASP, or in LMITCO PRDs and/or MCPs. During emergencies involving hazardous materials, airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization (ERO).

2.11 Safety Professional

The assigned LMITCO safety professional reviews work packages, observes site activity, assesses compliance with the LMITCO *Safety and Health Manual*, signs SWPs, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the site. The safety professional may have other duties at the site as specified in other sections of this HASP, or in LMITCO PRDs and/or MCPs.

2.12 Fire Protection Engineer

The assigned LMITCO fire protection engineer (FPE) reviews the work packages, conducts preoperational and operational fire hazard assessments, and is responsible for providing technical guidance to site personnel regarding all fire protection issues. Additionally, the assigned project fire engineer will provide fire extinguisher training to all project team personnel as part of the site-specific training.

2.13 Radiological Control Technician

The assigned LMITCO radiological control technician (RCT) is the primary source for information and guidance on radiological hazards and will be present at the site during all operations. Responsibilities of the RCT include radiological surveying of the site, equipment, and samples, providing guidance for radioactive decontamination (DECON) of equipment and personnel, and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the FTL of any radiological occurrence that must be reported as directed by the LMITCO *Radiation Protection Manual*. The RCT may have other duties at the site as specified in other sections of this HASP, or in LMITCO PRDs and/or MCPs.

2.14 Radiological Engineer

The radiological engineer is the primary source for information and guidance relative to the evaluation and control of radioactive hazards at the site. The radiological engineer will provide engineering design criteria and review of containment structures and makes recommendations to

minimize health and safety risks to site personnel. Responsibilities of the radiological engineer include: (1) performing radiation exposure estimates and as low as reasonably achievable (ALARA) evaluations; (2) identifying the type(s) of radiological monitoring equipment necessary for the work; (3) advising the FTL and RCT of changes in monitoring or PPE; and (4) advising personnel on site evacuation and reentry. The radiological engineer may also have other duties to perform as specified in other sections of this HASP, or in the LMITCO *Radiation Protection Manual.*

2.15 Facility Manager

The LMITCO facility manager is responsible to maintain his/her assigned facility, and must be cognizant of work being conducted in the facility. The facility manager is responsible for the safety of personnel and the safe completion of all project activities conducted within his/her area. Therefore, the facility manager and shift supervisor (SS) will be kept informed of all activities performed in the area. The SS and FTL shall agree on a schedule for reporting plans for work. The SS may serve as advisor to site personnel with regard to his/her or SS's area of operation.

2.16 Environmental ER Coordinator

The assigned LMITCO ER environmental coordinator oversees, monitors, and advises the PM and FTL performing site activities on environmental issues and concerns by ensuring compliance with DOE orders, EPA regulations, and other regulations concerning the effects of site activities on the environment. The environmental ER coordinator provides support surveillance services for hazardous waste storage and transport, and surface water/storm water runoff control.

2.17 Quality Engineer

A LMITCO ER quality engineer provides guidance on site quality issues, when requested. The quality engineer observes site activities and verifies that site operations comply with quality requirements pertaining to these activities. The quality engineer identifies activities that do not comply or have the potential for not complying with quality.

2.18 Area Director

The area director reports to the Director of Site Operations and interfaces with the Facility Manager. The Area Director is responsible for several functions and processes in the area that include:

- All work processes and work packages performed in the area
- Establishing and executing a monthly, weekly and daily operating plan for the area
- Executing the Environmental Safety and Health and Quality Assurance (ESH&QA) program for the area
- Executing the Integrated Safety Management System for the area
- Executing the Enhanced Work Planning for the area
- Executing the Voluntary Protection Program in the area
- All environmental compliance within the area

- Correcting the root cause functions of the accident investigation in the area

Correcting the root cause functions of the voluntary compliance order for the area.

3. RECORDKEEPING REQUIREMENTS

3.1 Industrial Hygiene and Radiological Monitoring Records

As necessary, the IH will record airborne monitoring and/or sampling data (both area and personal) on LMITCO IH forms. All monitoring and sampling equipment shall be maintained and calibrated per LMITCO procedures and the manufacturer's specifications. Industrial hygiene airborne monitoring and sampling data are treated as limited access information and maintained by the IH per LMITCO *Safety and Health Manual* procedures. Any airborne monitoring or sampling done by nonindustrial hygiene/safety personnel will be documented in a project controlled logbook, to be reviewed by the IH.

The RCT maintains a logbook of all radiological monitoring, daily site operational activities, and instrument calibrations. As necessary, radiological monitoring records are maintained according to the LMITCO *Radiation Protection Manual* procedures. Site personnel, or their representative, have a right to both IH and RCT monitoring and sampling (both area and personal) data.

3.2 FTL Logbook and Site Attendance Logbook

The FTL will keep a record of daily site events in the FTL logbook and shall maintain accurate records of all personnel (workers and nonworkers) who are onsite each day in a site attendance logbook. Logbooks must be obtained from Administrative Record and Document Control (ARDC). Completed logbooks are submitted to ARDC along with other documents at the project's completion.

3.3 Administrative Record and Document Control Office

The ARDC shall organize and maintain data and reports generated by Environmental Restoration Program (ERP) field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the Management Plans for the ERP, this HASP, the Quality Program Plan for the ERP (QPP-149), the quality project plan, and other documents pertaining to this work are maintained in the project file by the ARDC. All project records and logbooks, except IH and RCT logbooks, must be forwarded to ARDC within 30 days after completion of field activities.

4. PERSONNEL TRAINING

All site personnel shall receive training as specified in OSHA 29 CFR 1910.120/1926.65 and the LMITCO *Safety and Health Manuals*. Radiation workers shall be trained according to the LMITCO *Radiation Protection Manual,* MCP-126, "Training."

Additional training requirements for each worker may vary depending on the hazards associated with their individual job assignment and required access into radiologically controlled areas. **For site-specific training requirements, see Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).**

5. OCCUPATIONAL MEDICAL SURVEILLANCE PROGRAM

LMITCO site personnel shall participate in the INEEL OMP, as required by DOE Order 5480.8a and OSHA 29 CFR 1910.120/1926.65. Medical surveillance examinations will be provided before assignment, annually, and after termination of hazardous waste site duties or employment. This includes personnel who are or may be exposed to hazardous substances at or above the OSHA permissible exposure limit (PEL) or published exposure limits, without regard to respirator use, for 30 or more days per year. Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by 29 CFR 1910.134 (1910.139 when final rule becomes effective). This HASP, task hazard analysis, required PPE, confined space entry, and other exposure related information must be provided to an OMP physician for each employee participating in field activities. Exposure monitoring results and hazard information furnished to the OMP physician must be supplemented or updated annually as long as the employee is required to maintain a hazardous waste/hazardous material employee medical clearance.

The OMP physician shall evaluate the physical ability of an employee to perform the work assigned, as identified in the Site HASP or other job-related documentation. A documented medical clearance (physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him/her at increased risk of material impairment of his/her health from work in hazardous waste operations, emergency response, respirator use, and confined space entry (as applicable). The physician may impose restrictions on the employee by limiting the amount and/or type of work performed. OMP responsibilities, with regard to personnel assigned to hazardous waste site activities, include, but are not limited to:

- Providing current comprehensive medical examinations (as determined by the examining physician) at an INEEL medical facility for full-time personnel.
- Obtaining records/reports from employee's private physicians, as required by the OMP director.
- Performing a medical evaluation on return-to-work cases following an absence in excess of 1 work week (40 consecutive work hours) resulting from illness or injury.
- Conducting a medical evaluation in the event that management questions the ability of an employee to work or if an employee questions his/her own ability to work.

The attending physician will evaluate all information provided, including medical questionnaires, physical exam findings, blood chemistry and urinalysis results, preexisting medical conditions, nature of work to be performed, actual and potential hazards and exposures, and other factors deemed appropriate by the physician for determining the following for each employee:

- Ability to perform relevant occupational tasks.
- Ability to use respiratory protection.
- Ability to work in other PPE and heat/cold stress environments.
- Requirement for entry into substance-specific medical surveillance programs.

If the OMP does not have sufficient information to complete a medical evaluation before respirator training, the employee's supervisor will be notified. The employee will not be permitted to fit test until the needed information is provided and any additional examination or testing is completed.

5.1 Subcontractor Workers

Subcontractor site personnel shall participate in a subcontractor medical surveillance program that satisfies the requirements of OSHA 29 CFR 1910.120/1926.65. This program must make available medical examinations before assignment, annually, and after termination of hazardous waste duties. The physician written opinion will serve as documentation that subcontractor personnel are fit for duty.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, shall be made available to the LMITCO OMP physicians upon request. Also, subcontractor employee's past radiation exposure histories must be submitted to LMITCO radiation dosimetry and records section, in accordance with the *INEEL Radiation Protection Manual* , MCP-188, "Issuance of thermoluminescent dosimeters (TLDs) and Obtaining Employees Dose History" and MCP-2381, "Employees Exposure Questionnaire" of the LMITCO *Radiation Protection Manual.*

5.2 Injuries on the Site

It is LMITCO's policy that an OMP physician examine all injured personnel if an employee is injured on the job, is experiencing signs and symptoms consistent with exposure to a hazardous material, or if there is reason to believe that an employee has been exposed to toxic substances, or physical or radiological agents in excess of allowable limits.

NOTE: *Subcontractor employees will be taken to the closest LMITCO medical facility to have an injury stabilized before transport to the subcontractor's treating physician or medical facility.*

In the event of a known or suspected injury or illness due to exposure to a hazardous substance, or physical or radiological agent, the employee(s) shall be transported to the nearest LMITCO medical facility for evaluation and treatment, as necessary. The FTL is responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and phone number
- Substances, physical or radiological agents (known or suspected); material safety data sheet (MSDS), if available
- Date of employee's first (known) exposure to the substance, physical or radiological agent
- Locations, dates, and results of any airborne exposure monitoring and/or sampling
- PPE in use during this work (for example, type of respirator and cartridge used)
- Anticipated future exposure to the substance, physical or radiological agent.

Further medical evaluation will be determined by the treating/examining physician according to the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120/1926.65. As soon as

possible after an injured employee has been transported to the LMITCO medical facility, the FTL or designee, will make notifications as indicated in Section 11 of this HASP.

RADCON personnel will evaluate all actual and/or suspected abnormal radiological exposures in excess of allowable limits and will establish the follow-up actions. For internal uptakes (as calculated committed effective dose equivalent values), LMITCO EDF- INEL003, "Established Levels of Radionuclide Intake for Consideration of Medical Intervention" will be used as the basis for this evaluation and followup actions. All wounds will be examined by an OMP physician to determine the nature and extent of the injury. The physician will determine if the wound can be bandaged adequately for entry into a radiological contamination area in accordance with Article 542 of the *INEEL Radiological Protection Manual.*

5.3 Substance-Specific Medical Surveillance

An IH assessment was made to determine if any of the contaminants of concern require additional substance-specific regulatory medical surveillance. Based on the expected amount of material, distribution and mixing of these contaminants, material matrix, engineering and administrative controls, and worker training, no occupational exposures approaching the regulatory substance-specific action limits are anticipated.

6. ACCIDENT PREVENTION PROGRAM

Field activities may present potential chemical, radiological, and physical hazards to personnel conducting the required tasks. It is important that all personnel understand and follow the task-specific requirement of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will all be implemented to eliminate or mitigate the potential hazards and exposures. However, every person on the site must play their role in the identification and control of hazards.

6.1 Voluntary Protection Program

The INEEL's safety process embraces the Voluntary Protection Program (VPP) criteria, principles, and concepts. All levels of management are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel and subcontractors are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents and approved procedures.

VPP is a process that promotes and encourages continuous safety improvement. VPP is not a requirement of any regulatory agency. LMITCO and subcontractors participate in VPP voluntarily for the safety of their employees. VPP incorporates five key elements:

1. **Management Commitment** to safety and health is demonstrated through their visibility in the workplace and providing the necessary resources.

2. **Employee Involvement** means that employees have an active and meaningful role in contributing to the structure and operation of the safety and health program. This involvement results in ownership of the safety and health program by all employees.

3. **Work Site Analysis** includes analysis of new facilities and processes, comprehensive safety and health surveys, routine self-assessments, a reliable system for employees to report hazards, and an accident/incident investigation system and trend analysis.

4. **Hazard Prevention and Control** means that written safety rules and safe work practices must be in place to eliminate and/or control hazards.

5. **Safety and Health Training** is provided to all employees to ensure that they know what their responsibilities are and what is necessary to protect them from safety and health hazards.

6.2 General Safe-Work Practices

The following procedures are mandatory for all LMITCO and subcontractor personnel working on the site. All site visitors entering the site area (SZ and beyond) must follow these procedures. **Failure to follow these practices may result in permanent removal from the site and other disciplinary actions.** The FTL and HSO are responsible for ensuring these hazard control practices are followed at the site:

- Limit access to authorized LMITCO subcontractor, and visitor personnel only.

- All personnel have the authority to initiate **STOP WORK** actions. LMITCO *Safety and Health Manual,* MCP-553, "Stop Work/Shut Down Action" shall be used.

- Absolutely no eating, drinking, chewing gum or tobacco, smoking, applying cosmetics, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials except in designated zone(s).

- Be aware of and comply with all safety signs, color codes, and barriers. Adhere to LMITCO *Safety and Health Manual 14A,* MCP-2714, "Safety Signs, Color Codes, and Barriers."

- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and broken containers. Report all potentially dangerous situations to the FTL or HSO.

- Avoid direct contact with potentially contaminated substances. Do not walk through spills or other areas of contamination. Avoid kneeling, leaning, or sitting on equipment or ground that may be contaminated.

- Be familiar with the physical characteristics of the site, including, but not limited to:

  - Wind direction
  - Accessibility of fellow personnel, equipment, and vehicles
  - Communications at the site and with other nearby facilities
  - Areas of known or suspected contamination
  - Major roads and means of access to and from the site
  - Nearest water sources and fire fighting equipment
  - Warning devices and alarms
  - Capabilities and location of nearest emergency assistance.

- Report all broken skin or open wounds to the HSO or FTL. A LMITCO physician will determine if the wound presents a significant risk of internal chemical or radiological exposure. The OMP physician will consider how the wound can be bandaged and will recommend PPE to be worn by the injured employee. Personnel with unprotected wounds shall not be permitted to enter chemical or radiological Contamination Areas (CAs), nor shall they handle contaminated or potentially contaminated materials at the site without having been examined by a LMITCO OMP physician.

- Prevent releases of hazardous materials, including those used at the site. If a spill occurs, try to isolate the source (if possible and if this does not create a greater exposure potential), then report it to the FTL or HSO. Appropriate spill response kits, or other containment and absorbent materials, will be maintained at the site.

- Electrical equipment, wiring, cables, switches, and current overload protection will meet applicable regulations and be maintained in a manner that provides protection for project personnel from shock hazards, injury, and prevents property damage. Ground-fault protection will be provided whenever outdoor electrical equipment is used.

- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use nonsparking, explosion-proof equipment if advised to do so by a safety professional.

- Personnel working in the exclusion or controlled access zone shall implement the "buddy system" (see Section 6.5 of this HASP).

- Proceed directly to a radiological survey station upon leaving a radiologically contaminated zone. Care should be taken not to touch the face, mouth, and eyes before a survey has been performed.

- Personnel who wear contact lenses shall comply with the LMITCO Safety and Health Manual 14A, MCP-2716, "Personal Protective Equipment."

6.3 ALARA Principles

Radiation exposure of project personnel shall be controlled such that radiation exposures are below regulatory limits, and there is no radiation exposure without commensurate benefit. Unplanned and preventable exposures are considered unacceptable. All project tasks will be evaluated with the goal of eliminating or minimized exposures. Following ALARA principles and practices is the responsibility of all project personnel. All personnel working at the site must strive to keep both external and internal radiation doses ALARA by adopting the following practices.

6.3.1 External Radiation Dose Reduction

Basic protective measures used to reduce external doses include minimizing time in radiation areas, maximizing the distance from the source of radiation, and using shielding whenever possible. The following are methods to minimize external dose:

Methods for Minimizing Time

- Use mockups and practice runs during the cold test that will duplicate activities

- Plan and discuss the tasks before entering radiation area (including having all equipment and tools prepared)

- Perform as much work as possible outside radiation areas and take advantage of lower dose rate areas (as shown on the radiological survey maps)

- Take the most direct route to the tasks site and work efficiently

- If problems occur in the radiation areas, hold technical discussions outside radiation areas, then return to the work area to complete the task

- If stay times are required, know your stay time and use appropriate signal and communication method to let others in the area know when the stay time is up

- Know your current dose and your dose limit. DO NOT EXCEED YOUR DOSE LIMIT.

Methods for Maximizing Distance from Sources of Radiation

- Use remote operational controls

- Stay as far away from the source of radiation as possible (extremely important for point sources where, in general, if the distance between the source is doubled, the dose rate falls to ¼ the original dose rate)

- Know the most recent project radiological survey map high and low dose rate locations and take advantage of low dose rate areas.

Proper Use of Shielding

- Take advantage of the site equipment and enclosures for shielding yourself from radiation sources

- Wear safety glasses to protect eyes from beta radiation.

6.3.2 Internal Radiation Dose Reduction

An internal radiation dose potential exists at the site from radiological contamination. An internal dose is a result of radioactive material being taken into the body. Radioactive material can enter the body through inhalation, ingestion, absorption through wounds or injection from a puncture wound. Reducing the potential for radioactive material to enter the body is critical to avoid internal dose. The following are methods to minimize internal radiation dose:

- Wear respiratory protection required for the task, perform all leak checks, and inspect all PPE before entering CAs

- Know the project Radiological Work Permit (RWP) potential and known high and low contamination sources, locations, and minimize or avoid activities in these areas

- Use high-efficiency particulate air (HEPA) exhaust system

- When inside CAs, do not touch your face (adjust glasses or PPE) or other exposed skin

- When exiting CAs, follow all posted instructions and remove PPE in the order prescribed (if questions arise, ask RADCON personnel)

- Conduct whole body personal survey when exiting CA, then proceed directly to the personnel contamination monitor (PCM)

- Report all wounds or cuts (including scratches and scraps) before entering radiological CAs

- Wash hands, face, etc., before eating, drinking, smoking, or other activity that may provide a pathway for contaminants.

6.4 Nonradiological Contaminant Exposure Avoidance

The same engineering controls employed to eliminate or mitigate airborne radioactivity will serve to control nonradiological airborne contaminants. Every effort will be made to isolate the source of these hazards through engineering controls and containment where feasible. Some of these contaminants pose other exposure hazards from contact and skin absorption and the implementation of avoidance practices will serve to minimize the potential for exposures. Methods of exposure avoidance at the site include:

- Ensuring all HEPA systems are operating when they must be opened or handled
- Collecting bags to isolate the source of contamination
- Wearing all required PPE, inspecting all pieces before donning, taping all seams
- Changing gloves frequently (when soiled) to prevent the spread of contamination
- Changing PPE if it becomes damaged or soiled with source contaminants material
- Containerize samples to avoid handling twice
- Minimize time in known or suspected contamination areas (vapors, sludge, waste residue)
- Doff PPE following radiological instructions and perform personal whole body survey as directed by the task RWP (if radiological contamination is present, it is likely that other nonradiological forms of contamination are also present—if contamination is found, perform decontamination for both)
- Wash hands, face, etc., before eating, drinking, smoking, or other activity that may provide a pathway for contaminants.

6.5 The Buddy System

The "buddy system" will be used at the site when personnel have entered into the EZ. The buddy system requires each employee to assess and monitor their buddy's mental and physical well-being during the course of the work day. A buddy must be able to:

- Provide assistance
- Verify the integrity of PPE
- Observe partner for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the EZ if emergency assistance is needed.

Workers need to be able to see or hear and effectively communicate with their buddy at all times when in the EZ. Site personnel will be assigned a "buddy" by the FTL or HSO to work with and continually check on while work is performed in the EZ.

7. SITE CONTROL AND SECURITY

Based on the known, expected, and potential levels of radiological and chemical contamination present in the waste at the site, work zones/radiological areas will be established for the site. Entry into and exit out of site work zones will be controlled through the appropriate use of barriers, signs, and other measures that are described in detail in this section (refer to LMITCO *Safety and Health Manual,* MCP-2714). Personnel not directly involved with activities shall be excluded from entering work zones. Nonworker, such as inspectors, may be admitted to the site provided they are on official business, escorted by the HSO or FTL, and have demonstrated compliance with the training requirements in Section 4 of this HASP.

NOTE: *The HSO/IH and RCT will assist the FTL in establishing the work zones for the project based on IH exposure assessment, site characterization, and radiological evaluations.*

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial zone locations and size. **(For site specific zone locations, see Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).** Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted according to both sets of requirements (29 CFR 1910.120 and 10 CFR 835) using appropriate colored rope and postings. These zones may change in size and location as project tasks evolve, based on site monitoring data, and as wind direction changes. Additionally, entrances and egress points may change based on these same factors. Work zones may include:

- Exclusion Zones (EZs)
- Contamination reduction zone (CRZ)
- Contamination Reduction Corridor (CRC)
- Support Zone (SZ).

The LMITCO *Radiation Protection Manual*, MPC-187, "Posting Radiological Control Areas" shall be used for posting and controlling access to radiological controlled areas at the site. Radiologically controlled areas will be established by RADCON personnel at the site and described in the project RWP. Established areas may include:

- Radiological buffer area (RBA)
- Radiation area
- Contamination area (CA) with a step-off pad(s)
- Radioactive material area(s) (RMA)
- Radiological control trailer (CRC/SZ line) with a PCM.

7.1 Exclusion Zone

The EZ will be large enough to encompass all work areas. The minimum number of personnel required to safely perform the project tasks will be allowed into the EZ. The EZ is a controlled access zone at all times. An entry and exit point will be established at the periphery of the EZ/CRC to regulate the flow of personnel and equipment. If necessary, a sign-in board or log will be used to track entry in and exit out of the EZ. The EZ boundary will be delineated with rope, printed hazard ribbon, or pylons. **For site specific information regarding the Exclusion Zone, see Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).**

NOTE: *Nonsite personnel; are not permitted in the EZ without proper escort and satisfying the appropriate training requirements for being in the EZ.*

Factors that will be considered when establishing the EZ boundary includes air monitoring data, radiological contamination data, radiation fields, equipment in use, the physical area necessary to conduct site operations, and the potential for contaminants to be blown from the area. The boundary may be expanded or contracted as this information becomes available, based on the aforementioned evaluations.

Radiologically controlled areas will be established within the EZ to restrict the movement of personnel and equipment to prevent the potential spread of contamination. These areas will include a CA (immediately around the work area activities), step-off pad for exiting the CA, and RBA around the entire CA and step-off area. There will be designated entry and exit "lanes" for the CA (separated by rope). The entry lane will only be used for entrance into the CA and as a RADCON movement area for surveying airline connections and bagging out supplemental dosimetry. The exit lane from the CA will be through the step-off pads and function as a radiological contamination reduction corridor. All contaminated and potentially contaminated PPE will be containerized and stored in the CA until fully characterized. All items (including PPE, equipment, debris, etc.) generated during the radiological decontamination process, shall be characterized in compliance with MCP-444, "Characterization Requirements for Solid and Hazardous Waste." At radiologically contaminated areas, equipment will not be released from the CA until a comprehensive radiological survey has been completed (hand-held instruments, swipes, etc.) in accordance with LMITCO MCP-139, "Radiological Surveys," and has met the radionuclide-specific free release criteria described in DOE Order 5400.5, Section II-5(c), and listed on Figure IV-1 (5400.5).

All personnel who enter the EZ will wear the appropriate level of PPE for the degree and type of hazards present as listed in each appendix. When Level B activities are taking place, standby personnel will be stationed just outside the CA to respond to events inside the CA. These responders will don a portion of the same Level B protective clothing, as the worker inside the CA, and have the remaining required respiratory protection and protective clothing ensemble in the immediate area. The number of standby personnel will be determined on a task-by-task basis by the project HSO.

7.2 Contamination Reduction Zone and Corridor

The project CRZ and CRC are transition areas surrounding the EZ, and are located between the EZ and SZ. The CRZ and CRC will serve to buffer and further reduce the probability of the SZ becoming contaminated. The CRC will encompass an area large enough to allow for equipment to travel through. All project personnel and equipment entering and exiting the EZ will transition through the CRC. Physical transfer of contaminating substances on personnel, equipment, or in the air will be minimized through restricting traffic to these controlled areas. The CRZ and CRC may serve as staging areas for equipment and temporary rest areas for personnel. Because of the potential for cross-contamination, PPE and sample packaging and preparation equipment will be stored in the SZ. **For site specific information**

regarding the CRZ and CRC, see Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).

NOTE: *Nonsite personnel are not permitted in the CRZ without proper escort and satisfying the appropriate training requirements for being in the CRZ..*

In radiologically contaminated areas, all equipment and materials will be surveyed by RADCON personnel and must meet the free release criteria before being released out of the CA. If radiological or mixed contamination (nonradiological/radiological) is found, then radiological decontamination techniques will initially be used. One of the radiological decontamination goals is not to generate any free liquid. By using dry decontamination techniques (HEPA vacuum, adhesive tape, etc.) and avoiding radiological instrument shielding problems from the use of liquid washing methods, the likelihood of spreading contamination will be eliminated. A nonradiological decontamination pad may be established if it is believed that residual nonradiological contamination is present on equipment following release from the CA. The project IH will be responsible for nonradiological contamination issues and determining the most appropriate decontamination methods. A designated portion of the CRC will be established for the nonradiological decontamination of equipment (if required). All decontamination supplies (nonradiological decontamination solution, Teri wipes, etc.) and used nonradiological PPE and debris waste containers may be located in the CRC.

NOTE: *The presence of radiological contamination, along with visual observations and IH direct reading instruments, will serve as the primary indicator for nonradiological contamination. Since radiological instrumentation yield detection limits much lower than traditional IH direct reading instruments and data from previous investigation have shown high radiological contamination levels in waste, it is not believed that nonradiological contamination will be found at elevated concentrations without detectable radiological contamination.*

7.3 Support Zone

The SZ will be considered a "clean" area. The location of the SZ will be upwind of the EZ (where possible) and readily accessible to the nearest road. The SZ is a controlled area outside the CRZ. Support facilities (project management and RADCON trailers), project command center, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment will all be located in the SZ. Visitors who have not had appropriate training and have not received site-specific training will be restricted to this zone. **For site specific information regarding the Support Zone, see Appendix C (Explosive compounds), Appendix D (OMRE), and Appendix E (Wild Onions).**

Site work zones and radiologically controlled areas will be maintained during off-hours and weekends. These zones and areas will remain intact until all site tasks have been completed and equipment and supplies have been decontaminated and removed from the site. The FTL, HSO, and RCT will ensure that site zones are posted and intact when leaving the site, and will be responsible for breaking down the zones when site activities have been completed.

NOTE: *Only RADCON personnel can post and remove radiological control postings. This will be accomplished in accordance with LMITCO Radiation Protection Manual and MCP-187, "Posting Radiological Control Areas."*

7.4 Designated Eating and Smoking Area

Ingestion of hazardous substances is likely when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. **No smoking, chewing, eating, applying lip balm, or drinking is allowed within the EZ, CRZ, and CRC. Per LIMITCO and DOE policy, smoking is not allowed in government vehicles or in government buildings.** All personnel who enter into the CA **MUST** complete a whole body survey as directed by the RWP. As a minimum, all personnel will wash their hands before using designated eating or smoking areas. Personnel will not be permitted to smoke in the EZ, CRZ, or CRC. Only approved facility smoking areas will be used by project personnel. All smoking polices will be complied with, including disposing of smoking materials in the proper receptacle.